CLAIMS

Pub A1

1. A tape printing apparatus for printing an image on an image receiving tape comprising:

a thermal print head for printing an image on said image receiving tape, said print head having a first mode of operation and a second mode of operation;

receiving means for receiving in the first mode of operation a supply of image receiving tape and a supply of ink ribbon for providing an image on said image receiving tape, and in the second mode of operation a supply of thermally sensitive image receiving tape;

driving means for driving said ink ribbon;

control means for controlling the thermal print head; and

detecting means for detecting if ink ribbon is present or absent in said receiving means and arranged to provide a signal to the control means indicative of the presence or absence of ink ribbon, said control means being arranged to control the print head to have the first mode of operation when ink ribbon is present and the second mode of operation when no ink ribbon is present, wherein said detecting means is arranged to detect, when said driving means is activated, a characteristic indicative of movement of said ink ribbon to determine if ink ribbon is present.

2. A tape printing apparatus for printing a label on an image receiving tape comprising:

a thermal print head arranged at a print zone for printing the label on the image receiving tape as the image receiving tape passes through the print zone, said print head having a first mode of operation and a second mode of operation;

control means for controlling the thermal print head;

receiving means for receiving in the first mode of operation a supply of image receiving tape and a supply of ink ribbon for providing an image on said image receiving tape and in the second mode of operation a supply of thermally sensitive image receiving tape;

detecting means for detecting a characteristic indicative of the presence or absence of ink ribbon and arranged to provide a signal to the control means indicative of the presence or absence of ink ribbon, wherein said control means controls the print head to have said first mode of operation when ink ribbon is present and said second mode of operation when no ink ribbon is present; and

cutting means for separating a printed label from the supply of image receiving tape.

3. A tape printing apparatus as claimed in claim 2, wherein a support member is provided to support the ink ribbon, said support member having a first position when ink ribbon is present and a second position when no ink ribbon is present, said detecting means being arranged to detect a characteristic indicative of the position of said support member to determine if ink ribbon is present or absent.

4. A tape printing apparatus as claimed in claim 3, wherein said support member is a rotatable support member having gear means, said gear means having a first position in which the gear means is coupled to the drive means when said ink ribbon is present and a second position when ink ribbon is not present, said detecting means being arranged to detect a characteristic indicative of whether the gear means is in the first position or the second position.

5. A tape printing apparatus as claimed in claim 4, wherein said detecting means is ~~arranged~~ positioned to detect the position of the gear means.

6. A tape printing apparatus as claimed in any of claims 3 to 5, wherein said detecting means is ~~arranged~~ positioned to detect the position of the support member.

7. A tape printing apparatus as claimed in claim 2, wherein said detecting means is arranged to determine if ink ribbon is

present along a portion of an ink ribbon path.

8. A tape printing apparatus as claimed in claim 7, wherein said detecting means comprises a first emitting element and a second detecting element, wherein the first emitting element is arranged to emit a signal which interacts with said ink ribbon when present and said detecting element, depending on whether or not ink ribbon is present, either receives or does not receive the signal emitted by the emitting element.

9. A tape printing apparatus as claimed in claim 2, wherein driving means are provided for driving said ink ribbon and the detecting means is arranged to detect, when said driving means is activated, a characteristic indicative of movement of said ink ribbon to thereby determine if an ink ribbon is present.

10. A tape printing apparatus as claimed in claim 1 or 9, wherein said ink ribbon is mounted on a rotatable support member and said detecting means is arranged to detect a characteristic indicative of rotational movement of said ink ribbon.

11. A tape printing apparatus as claimed in claim 10, wherein said rotatable support member has a first speed of rotation when an ink ribbon is present and a second speed of rotation when no ink ribbon is present, and said detecting means is positioned ~~arranged~~ to detect a characteristic indicating the speed of rotation of said rotatable support member.

12. A tape printing apparatus as claimed in claim 11, wherein said rotatable support means is driven by said driving means, said rotatable support means rotating more quickly when no ink ribbon is present as compared to when an ink ribbon is present.

13. A tape printing apparatus as claimed in claim 10, 11 or 12, wherein said rotatable support member is arranged to support take up means for taking up the ink ribbon, when present, after said ink ribbon has been driven by said driving means past said print

head.

14. A tape printing apparatus as claimed in any of claims 10 to 13, wherein said rotatable support member is coupled via a slipping clutch to a driving gear of said driving means, whereby when no ink ribbon is present the support member rotates at the same speed as the driving gear and when ink ribbon is present the slipping clutch slips so that rotatable support member rotates at a lower speed than the driving gear.

15. A tape printing apparatus as claimed in claim 11, wherein said support member for supporting the supply of the ink ribbon is freely rotatable such that the rotatable support member is substantially stationary when no ink ribbon is present and rotates when the ink ribbon is present.

16. A tape printing apparatus as claimed in any one of claims 11 to 15, wherein, in use, a reel for the ink ribbon is supported on said rotatable support member and said detecting means are arranged to monitor the speed of rotation of said reel to thereby provide an indication of the speed of rotation of said support member.

17. A tape printing apparatus as claimed in claim 16, wherein said reel is provided with a surface having a plurality of markings, said detecting means being positioned ~~arranged~~ to detect the markings as the reel rotates with the rotatable support means to provide an indication of the speed of the rotatable support means.

18. A tape printing apparatus as claimed in any of claims 11 to 15, wherein a member is provided on said rotatable support member which rotates therewith, and said detecting means is arranged to detect the rotation of said member to provide an indication of the speed of the rotatable support means.

19. A tape printing apparatus as claimed in claim 18, wherein

said member comprises a disc having a plurality of markings and the detecting means is ~~arranged~~ positioned to detect the markings as the disc rotates with the rotatable support member to provide an indication of the speed of the support member.

20. A tape printing apparatus as claimed in claim 19, wherein said markings comprise a plurality of holes in said disc and said detecting means comprises a light source and a detector.

21. A tape printing apparatus as claimed in claim 1, 8 or 9, wherein said detecting means comprises a movable member having a first position when an ink ribbon is present and a second position when no ink ribbon is present, and the detecting means is arranged to determine the position of said movable member.

22. A tape printing apparatus, as claimed in claim 21, wherein said movable member is arranged to be in said second position when a supply of the ink ribbon is present and stationary, and to move to said first position only when the ink ribbon is driven by said driving means.

23. A tape printing apparatus as claimed in any one of the preceding claims, wherein in the first mode of operation of the print head, the print head energy requirements are at a first level and in the second mode of operation of the print head, the print head energy requirements are at a second level.

24. A tape printing apparatus as claimed in claim 23, wherein the print head energy requirements are changed by altering one or more of the following print head operating parameters:

a voltage applied to each printing element of the print head;

length of time for which each printing element of the print head is activated; and

the number of times that each printing element of the print head is activated for the same set of print data.

25. A tape printing apparatus as claimed in any preceding claim, wherein in said first mode of operation, the image receiving tape and the ink ribbon are received in a first cassette and in the second mode of operation, the image receiving tape is received in a second cassette.

26. A tape printing apparatus as claimed in any of claims 1 to 24, wherein in said first mode of operation, the image receiving tape and the ink ribbon are received in separate cassettes and in the second mode of operation, the image receiving tape is received in a cassette.

27. A tape printing apparatus as claimed in claim 25, when appended to claim 3, 4, 5 or 6, wherein said first cassette has an aperture in a first location for receiving said support member and the second cassette has an aperture for receiving said support member in a second location such that the first cassette causes the rotatable support member to be in the first position and the second cassette causes the support member to be in the second position.

28. A tape printing apparatus as claimed in any of claims 1, 2 or 9, wherein said detecting means is arranged to detect a characteristic indicative of the power consumed by said drive means, the drive means being arranged such that the power consumed thereby is greater when ink ribbon is present as compared to when no ink ribbon is present.

29. A tape printing apparatus as claimed in claim 28, wherein said characteristic indicative of the power of ~~the drive~~ said driving means is the drive current applied thereto.

30. A tape printing apparatus as claimed in any preceding claim, comprising means for determining when a supply of image receiving tape is first inserted or replaced whereby the tape printing apparatus is arranged so that the mode of operation of the print head is only determined when said determining means determines

that a supply of image receiving tape has been inserted or replaced.

31. A cassette comprising a housing in which a reel holding a supply of tape is arranged, said reel being rotatable with respect to said housing and having a plurality of markings thereon, said housing being arranged so that said markings are detectable by ~~a detecting arrangement~~ means external to said cassette to provide information relating to the rotation of said reel.

32. A cassette as claimed in claim 31, ~~wherein~~ said tape is ink ribbon.

33. A cassette as claimed in claim 32, wherein said reel supports a supply of unused ink ribbon or a supply of ink ribbon which has been used.

34. A cassette as claimed in any of claims 31 to 33, wherein said housing is provided with an opening through which said markings are detectable.

35. A cassette as claimed in claim 34, wherein said opening comprises substantially transparent material.

36. A cassette as claimed in any of claims 31 to 35 in combination with a tape printing apparatus as claimed in claim 17.

37. A tape printing apparatus for printing an image on an image receiving tape comprising:

a thermal print head for printing an image on said image receiving tape, said print head having a first mode of operation and a second mode of operation; and

receiving means for receiving in the first mode of operation a supply of image receiving tape and a supply of ink ribbon for providing an image on said image receiving tape, and in the second mode of operation a supply of thermally sensitive image

receiving tape;

control means for controlling the thermal print head;

means for directing the image receiving tape along a first path in the first mode of operation and along a second path in a second mode of operation;

detecting means for determining if the image receiving tape follows the first or the second path and arranged to provide a signal to the control means indicative of the path of the image receiving tape, said control means being arranged to control the print head to have the first mode of operation if the image receiving tape follows the first path and the second mode of operation if the image receiving tape follows the second path.

38. A tape printing apparatus for printing an image on an image receiving tape comprising:

a thermal print head for printing an image onto an image receiving tape, said print head having a first mode of operation and a second mode of operation;

receiving means for receiving in the first mode of operation a supply of image receiving tape and a supply of ink ribbon for providing an image on an image receiving tape, and in the second mode of operation a supply of thermally sensitive image receiving tape;

control means for controlling the thermal print head;

drive means for driving the image receiving tape and the ink ribbon, when present, past the print head; and

means for detecting a characteristic indicative of the presence or absence of ink ribbon and arranged to provide a signal to the control means indicative of the presence or absence of ink ribbon, the control means controlling the print head to have the first mode of operation when ink ribbon is present and the second mode of operation when no ink ribbon is present, wherein said detecting means is arranged to detect a characteristic indicative of the power consumed by said drive means, said drive means consuming more power when ink ribbon is present as compared to when no ink ribbon is present.

39. A tape printing apparatus for printing an image on an image receiving tape comprising:

a thermal print head for printing an image on said image receiving tape, said print head having a first mode of operation and a second mode of operation;

receiving means for receiving in the first mode of operation a supply of image receiving tape and a supply of ink ribbon for providing an image on said image receiving tape, and in the second mode of operation a supply of thermally sensitive image receiving tape;

control means for controlling the print head;

drive means for driving the image receiving tape and ink ribbon, when present, past the print head; and

detecting means for detecting a characteristic indicative of the presence or absence of ink ribbon and arranged to provide a signal to the control means indicative of the presence or absence of ink ribbon, the control means controlling the print head to have the first mode of operation when ink ribbon is present and the second mode of operation when no ink ribbon is present, and said detecting means is arranged to detect the load applied to said drive means, the load applied to the drive means being greater when ink ribbon is present as compared to when no ink ribbon is present.